

## PATENT ABSTRACTS OF JAPAN

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(54) DEVICE AND METHOD FOR MEASURING USE TIME OF STEREOSCOPIC VIDEO DISPLAY

(57)Abstract:

**PROBLEM TO BE SOLVED:** To prevent the generation of the excessive human stress of an operator due to use for the long period of time by measuring use time and displaying continuous use time and total integrated use time.

**SOLUTION:** When the operator mounts a head mounted display(HMD) 1 to a head part and starts watching stereoscopic video images, a signal detector 2 detects mounting signals and detects that stereoscopic video signal from a stereoscopic camera are inputted to the HMD 1 and the operator starts a timer 4 for measuring the use time. When the continuous use time reaches a limit time set beforehand, an alarm for indicating that the use should be stopped since the use time is exceeded is displayed on a display device 5. Also, a control part 3 collates an inputted registration name with recorded contents, permits the use when it is registered and measures and displays the continuous use time and the total use time for respective operator individuals.

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### CLAIMS

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[Claim 1] A hour-of-use measuring device characterized by comprising the following in a 3-dimensional scenography display.

A 3-dimensional scenography display.

A 3-dimensional scenography display time measuring means which has a function which 1 time of continuous use time of this 3-dimensional scenography display is measured, and integrates all the hours of use.

A hour-of-use displaying means which displays said continuous use time and all the hours of use.

[Claim 2] A hour-of-use measuring device in the 3-dimensional scenography display according to claim 1 emitting an alarm when continuous use time or all the hours of use which were beforehand set up during hour-of-use measurement of said 3-dimensional scenography display are exceeded.

[Claim 3] A hour-of-use measuring device in the 3-dimensional scenography display according to claim 1 having a function which registers a user of said 3-dimensional scenography display, and measures a hour of use according to this user.

[Claim 4] A hour-of-use measuring device characterized by comprising the following in the 3-dimensional scenography display according to claim 1 to 3.

A means to detect having equipped a head with HMD.

A means to detect a video signal input to said HMD.

A timer for time tests.

A time display means which displays measuring time.

[Claim 5] A means to detect having equipped a head with said HMD.

A means to detect a video signal input to said HMD.

A timer for time tests.

A time display means which displays measuring time.

When it is a hour-of-use measuring method in a 3-dimensional scenography display provided with the above, 3-dimensional scenography is displayed by HMD and it is detected that a 3-dimensional scenography signal has inputted HMD into having equipped a head and HMD, a timer is driven, and time is measured and displayed.

[Claim 6] A hour-of-use measuring device characterized by comprising the following in the 3-dimensional scenography display according to claim 1 to 3.

A means to detect sitting on a chair before a monitor.

A means to detect having equipped with a polarization eyeglass.

A means to detect an input of a 3-dimensional scenography signal to a monitor, and an operation of a liquid crystal shutter.

A timer for time tests, and a time display means.

[Claim 7] In a hour-of-use measuring method in said 3-dimensional scenography display, when displaying 3-dimensional scenography by polarization eyeglass, liquid crystal shutter, and monitor, it is sitting on a chair ahead of a monitor, A hour-of-use measuring method in a 3-dimensional scenography display driving a timer, and measuring and displaying a hour of use when it is detected, respectively that a 3-dimensional scenography signal has inputted into having equipped with a polarization eyeglass, that the liquid crystal shutter is operating, and a monitor.

[Claim 8] Claims 1 thru/or 3 comprising:

A means to detect sitting on a chair.

A means to detect that a 3-dimensional scenography signal has inputted into a monitor.

A timer for time tests.

A hour-of-use displaying means.

[Claim 9] A means to detect sitting on a chair.

A means to detect that a 3-dimensional scenography signal has inputted into a monitor.

A timer for time tests.

A hour-of-use displaying means.

When displaying 3-dimensional scenography without being a hour-of-use measuring method in a 3-dimensional scenography display provided with the above and making people equip with a 3-dimensional scenography display or an instrument, When it detects that a 3-dimensional scenography signal has inputted into sitting on a chair arranged ahead of a monitor, and a monitor, a timer is driven, and a hour of use is measured and displayed.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the hour-of-use measuring device and hour-of-use measuring method in a 3-dimensional scenography display.

[0002]

[Description of the Prior Art] From before, the solid visual system attracts attention as art effective in remote control systems or a virtual reality system, and many systems are proposed. It is possible to make environment as if it was in the virtual space by the place and computer graphics which he left in such remote control systems and a virtual reality system. As art which raises the man-machine interface currently taken into consideration in those systems, For example, the device it was considered that checked neither the art of the optical system reproduced in the form near real environment currently indicated by JP,3-54518,A and JP,4-128222,A nor a worker's operation is known.

[0003]

[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional technology, when doing work, looking at 3-dimensional scenography for a long time, it may be generated by the case which causes human stress, such as asthenopia and displeasure. In these systems, although it was possible as this measure to restrict the hour of use of a device, since work was possible with feeling which is in the spot, it was devoted to work and there was a problem of overlooking the passage of time.

[0004]then, the purpose of this invention -- a 3-dimensional scenography display (HMD; -- a head mounted display.) a half mirror type monitor + polarization eyeglass, a liquid crystal shutter + polarization eyeglass, and a lenticular lens -- containing -- with the time which is looking at 3-dimensional scenography according to those who use it, or the user in the case of using it, registering. It is in providing the hour-of-use measuring device and method in the 3-dimensional scenography display which forbids the device use covering a user's long time as emits an alarm, when all the hours of use are shown to a user and a set period is exceeded, and can prevent generating of human stress.

[0005]

[Means for Solving the Problem]In order to attain the above-mentioned purpose, use of 3-dimensional scenography displays (HMD, a half mirror type monitor + polarization eyeglass, a liquid crystal shutter + polarization eyeglass, a lenticular lens, etc.) is faced this invention. It constitutes so that a hour of use may be measured, continuous use time and all the hours of use may be displayed and use beyond a set period may be prevented.

[0006]Like a statement composition which realizes the purpose of an invention concerning this application to claim 1, A 3-dimensional scenography display and a 3-dimensional scenography display time measuring means which has a function which 1 time of continuous use time of this 3-dimensional scenography display is measured, and integrates all the hours of use, It is in a hour-of-use measuring device in a 3-dimensional scenography display provided with a hour-of-use displaying means which displays said continuous use time and all the hours of use.

[0007]According to this composition, 1 time of continuous use time of another HMD and 3-dimensional scenography display and all the hours of use which integrated a hour of use can be displayed.

[0008]When continuous use time according to claim 2 or all the hours of use which were beforehand set up during hour-of-use measurement of said 3-dimensional scenography display like are exceeded, a hour-of-use measuring device in the 3-dimensional scenography display according to claim 1 emitting an alarm has concrete composition which realizes the purpose of an invention concerning this application.

[0009]According to this composition, the worker can recognize an excess of a hour of use clearly.

[0010]A hour-of-use measuring device in a 3-dimensional scenography display having the function according to claim 3 which registers a user of said 3-dimensional scenography display, and measures a hour of use according to this user like has other concrete composition which realizes the purpose of an invention concerning this application.

[0011]According to this composition, when constructing a work team and working by turns, a hour of use of one person and one person can be displayed correctly.

[0012]Other concrete composition which realizes the purpose of an invention concerning this application, A means to detect the thing [ having equipped a head

with HMD in claims 1 thru/or 3 like ] according to claim 4, It is in a hour-of-use measuring device in a 3-dimensional scenography display provided with a time display means which displays a means to detect that a video signal has inputted into said HMD, a timer for time tests, and measuring time.

[0013]According to this composition, as a 3-dimensional scenography display of a hour-of-use measuring device shown in claims 1-3, when carrying out wearing use of the HMD, when continuous use time and all the hours of use are displayed and time exceeds, an alarm can be emitted, and a user can be registered.

[0014]Other concrete composition which realizes the purpose of an invention concerning this application, When [ according to claim 5 ] displaying 3-dimensional scenography by HMD in a device of claim 4 like, When it is detected that a 3-dimensional scenography signal has inputted HMD into having equipped a head and HMD, a timer is driven and it is in a hour-of-use measuring method in a 3-dimensional scenography display measuring and displaying time.

[0015]If according to this composition a 3-dimensional scenography signal's having inputted into wearing on a head of HMD and HMD and both are detected while using HMD of claim 4, a worker can judge that 3-dimensional scenography is seen and can start a timer of a time test.

[0016]Other concrete composition which realizes the purpose of an invention concerning this application, A means to detect the thing [ sitting on a chair before a monitor in claims 1 thru/or 3 like ] according to claim 6, It is in a means to detect having equipped with a polarization eyeglass, a means to detect an input of a 3-dimensional scenography signal to a monitor, and an operation of a liquid crystal shutter, a timer for time tests, and a hour-of-use measuring device in a 3-dimensional scenography display provided with a hour-of-use displaying means.

[0017]When using a 3-dimensional scenography display by combination of a polarization eyeglass and a half mirror type monitor, or combination of a polarization eyeglass and a liquid crystal shutter as a 3-dimensional scenography display according to this composition, When continuous use time and all the hours of use are displayed and a hour of use exceeds, an alarm can be emitted, and a user can be registered.

[0018]Other concrete composition which realizes the purpose of an invention concerning this application, When [ according to claim 7 ] equipping with a polarization eyeglass and displaying 3-dimensional scenography by liquid crystal shutter and monitor in a device of claim 6 like, it is sitting on a chair ahead of a monitor, When it detects, respectively that a 3-dimensional scenography signal has inputted into having equipped with a polarization eyeglass, that the liquid crystal shutter is operating, and a monitor, a timer is driven and it is in a hour-of-use measuring method in a 3-dimensional scenography display measuring and displaying a hour of use.

[0019]When using a 3-dimensional scenography display by a liquid crystal shutter type or a half mirror type monitor of claim 6 according to the above-mentioned

composition, a worker sat on a chair, If wearing of a polarization eyeglass, an operation of a liquid crystal shutter, or all inputs of a 3-dimensional scenography signal to a monitor are detected, the worker can judge that 3-dimensional scenography is seen and can start a timer for time tests.

[0020]Other concrete composition which realizes the purpose of an invention concerning this application, A means to detect the thing [ sitting on a chair in claims 1 thru/or 3 like ] according to claim 8, It is in a means to detect that a 3-dimensional scenography signal has inputted into a monitor, a timer for time tests, and a hour-of-use measuring device in a 3-dimensional scenography display provided with a hour-of-use displaying means.

[0021]According to this composition, when using a 3-dimensional scenography display using a lenticular sheet lens plate as a 3-dimensional scenography display, continuous use time and all the hours of use are measured and displayed, and if a hour of use exceeds, an alarm is emitted and a user's registration is also possible.

[0022]Other concrete composition which realizes the purpose of an invention concerning this application, When [ according to claim 9 ] displaying 3-dimensional scenography in a device of claim 8 like without making people equip with a device for a 3-dimensional scenography display, or an instrument, When it detects that a 3-dimensional scenography signal has inputted into sitting on a chair arranged ahead of a monitor, and a monitor, a timer is driven and it is in a hour-of-use measuring method in a 3-dimensional scenography display characterized by a thing which measure and display a hour of use, and to do.

[0023]If according to this composition it detects that a worker sat on a chair, and that a 3-dimensional scenography signal has inputted into a monitor when using a lens mold lenticular 3-dimensional scenography display of claim 8, the worker can judge that 3-dimensional scenography is seen and can start a timer for time tests.

[0024]

[Embodiment of the Invention]Hereafter, an embodiment of the invention is described based on figures. Drawing 1 is a lineblock diagram of the hour-of-use measuring device in the 3-dimensional scenography display concerning a 1st embodiment of this invention. 1 being HMD, and this HMD1 being a stereo viewer type 3-dimensional scenography display which displays the image of each right and left on the screen of two right and left, and fundamentally, in drawing 1, Are the shape which arranges a small liquid crystal display in both eyes, and equips a head with it, and attach a three-dimensional position sensor (not shown) to it, and the position of a wearing person's viewpoint is detected continuously, Since the sight of the virtual circumference will be displayed in connection with a motion of the head if a cubic effect is acquired, it equips with HMD1 and it looks around the neighborhood by displaying the picture seen from there, virtual reality feeling which has entered into it exactly is acquired. See-through type HMD which enabled it to pile up and display another picture in the meaning to which the view of HMD is expanded is also used well.

[0025]2 is that the worker equipped the head with HMD1, and a signal detector with which a 3-dimensional scenography signal detects having inputted into HMD1 from a stereoscopic camera (not shown). 3 builds in CPU, ROM, RAM, EEPROM, etc. and the timer 4 by the control section constituted from a personal computer. 5 is a display which displays the measured time and also emits an alarm.

[0026]Operation is explained below. If a worker equips a head with HMD1, inputs a 3-dimensional scenography signal and begins to keep watching for a stereoscopic picture, the signal detector 2 will detect the mounting signal by the microswitch etc. which are emitted when it equips with HMD1, and detect both that the 3-dimensional scenography signal from a stereoscopic camera has inputted into HMD1, send a result to the control section 3, and it checks that HMD1 is ending with wearing in a head, and the 3-dimensional scenography signal has inputted the control section 3. A worker judges with having kept watching for a stereoscopic picture, and starts the timer 4 for hour-of-use measurement.

[0027]Since the control section 3 starts the timer 4, it displays the continuous use time which is using HMD1 on the display 5 every moment. If continuous use time has reached the limiting time (for example, 0.5 etc. hour etc.) set up beforehand, since it is an excess of a hour of use, an alarm display will be carried out on the display 4 so that use may be stopped. This warning may emit an alarm by blink of sound, such as a buzzer, or an alarm lamp, etc. When working simultaneously with the display of continuous use time also before the work [ at that day ] of this time, All the hours of use which memorize the last hour of use in RAM or EEPROM, and integrated this hour of use to that storage time are also displayed, and when the limiting time (for example, 10 hours) which also set up these hours of use of all the beforehand is exceeded, he is trying for the control section 3 to emit an alarm.

[0028]When a lot of people work by shift operations as a fatigue detail, Carry out registration record at EEPROM of the control section 3, and a member's name (or registration number) is placed, a worker inputs a library-name at the time of work (or -- inputting from an ID card), and if the control section 3 compares the inputted library-name with the contents of record and it has registered, it will permit use, and it measures and displays continuous use time and all the hours of use about each worker individual. An alarm will be emitted if the continuous use time about the individual concerned and all the hours of use reach limiting time.

[0029]Next, a 2nd embodiment of this invention is described. Drawing 2 is a lineblock diagram of the hour-of-use measuring device in the 3-dimensional scenography display concerning a 2nd embodiment of this invention. In drawing 2, 21 is a chair installed in the operation room where a worker sits down etc., and if a worker sits down, a microswitch or the limit switch will operate and it will emit a signal. The liquid crystal shutter time-division system which displays 3-dimensional scenography by 22 opening and closing a liquid crystal shutter on either side by turns, and displaying the image for right eyes, and the image for left eyes by turns synchronizing with this, Synthetic polarization (.) which generates a picture on either

side with the light of different polarization, and projects a picture on either side simultaneously using a half mirror. From or the screen which also has the time sharing polarization which switches a picture on either side combining a time sharing type further. the 3-dimensional scenography display (it is the same screen system with both these easier methods than the case of HMD) by the 2 methods of the polarization method which \*\*\*\*\* 3-dimensional scenography with the easy polarization eyeglass equipped with a polarizing plate — it is a polarization eyeglass of business. If it equips with the polarization eyeglass 22, the microswitch etc. will operate and a mounting signal will be emitted.

[0030]23 is a monitor which displays the 3-dimensional scenography which equips with and carries out the corporal vision of the polarization eyeglass 22, and 24 is a signal detector, and The seat arrival item from the chair 21, It checks the mounting signal from the polarization eyeglass 22, that the liquid crystal shutter is carrying out the switching operation with given periods (120 Hz etc.), and that the 3-dimensional scenography signal has inputted into the monitor 23, and a signal is sent out. 25 is a control section which drives the timer 26 with the transmission signal of the signal detector 24, measures a hour of use, and is displayed on the display 5.

[0031]Operation is explained below. If a worker sits on the chair 21, carries the polarization eyeglass 22 and projects 3-dimensional scenography on the monitor 23, The signal detector 24 carries out AND processing of the seat arrival item of the chair 21, the mounting signal of the polarization eyeglass 22, the operation of a liquid crystal shutter, or the input of the 3-dimensional scenography signal to the monitor 23, and when all the signals are Hi(s), it sends a signal to the control section 25. Hi of three signals is checked, a worker judges that it has kept watching for 3-dimensional scenography, starts the timer 26 for hour-of-use measurement, and the control section 25 measures a hour of use, and displays continuous use time and all the addition hours of use on the display 5. The generation processing of the alarm by the alarm display in an excess of the time limit, an alarm lamp, an audible tone, etc. and the registration processing according to individual in a shift are the same as the case of a 1st embodiment.

[0032]Next, a 3rd embodiment of this invention is described. Drawing 3 is an explanatory view of the 3-dimensional scenography display concerning a 3rd embodiment of this invention. In drawing 3, 31 is a board lens of the shape where much boiled fish paste called a lenticular sheet lens was put in order. 32 is a screen (monitor) which projects with a projector the parallax picture seen through the lenticular sheet lens 31. In order to lose inconvenient [ which is produced when it equips with HMD1 / that a view does not become narrow, only a virtual world is in sight, or expression cannot be seen ], Although a holography is ideal, since the real-time operation is impossible at present, a lenticular sheet lens is appearing as a method which realizes a corporal vision without glasses to instead of.

[0033]The picture which should be in sight from the viewpoint left little by little horizontally as a principle is generated, and it is made the shape of a strip of paper



at the vertical end, arranges, and displays on a screen (or monitor). Since the positions to which a look carries out image formation of this even if it lets the lenticular sheet lens plate 31 pass and pushes a right eye and a left eye in the same boiled-fish-paste-like lens differ, it is a method which a different image is visible to both eyes, and produces a cubic effect by this. This method is also the same, same screen system as a 2nd embodiment.

[0034] Since a worker does not use the mounting object for corporal visions by a lenticular sheet lens method, the lineblock diagram of the hour-of-use measuring device in this case serves as composition excluding the polarization eyeglass 22 from drawing 2.

[0035] Operation is explained below. If a worker inputs a 3-dimensional scenography signal into a monitor and begins to keep watching for a stereoscopic model via the lenticular sheet 31, it detects that the seat arrival item and the 3-dimensional scenography signal have inputted the signal detector 24 into the monitor 23, and it is notified to the control section 25, and the control section 25 starts the timer 26, measures a hour of use, and displays continuous use time and all the addition hours of use on the display 5. The control section 25 will emit an alarm, if continuous use time or all the addition hours of use exceed limiting time (longer than a front embodiment). In a shift, it registers for every everybody, and they display the continuous use time and all the hours of use for every everybody.

[0036]

[Effect of the Invention] As explained above, according to this invention, it is a 3-dimensional scenography display (). [ HMD and ] Use is faced a polarization method, a liquid crystal shutter method, and a lenticular sheet lens method, Since it constituted so that a hour of use was measured, continuous use time and all the addition hours of use were displayed, the excess use beyond a set period might be forbidden, it might register according to an individual in a shift and continuous use time and all the addition hours of use might be displayed according to an individual. The excessive human stress of the worker by prolonged use of a solid visual system can be prevented.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is a lineblock diagram of the hour-of-use measuring device in the 3-dimensional scenography display concerning a 1st embodiment of this invention.

[Drawing 2] It is a lineblock diagram of the hour-of-use measuring device in the 3-dimensional scenography display concerning a 2nd embodiment of this invention.

[Drawing 3] It is an explanatory view of the 3-dimensional scenography display concerning a 3rd embodiment of this invention.

[Description of Notations]

1 HMD

2 and 24 Signal detector  
3 and 25 Control section  
4 and 26 Timer  
5 Display  
21 Chair  
22 Polarization eyeglass  
23 Monitor  
31 Lenticular sheet lens  
32 Screen

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[Translation done.]

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